

1. (Amended) A method of identifying cells expressing a preselected molecule comprising the steps of:

providing a plurality of cells at least some of which express the preselected molecule;

providing a plurality of silica-coated nanoparticles coated with a functional group that binds to the preselected molecule, each of said nanoparticles having a mean size of less than 1 micron and comprising a core comprising a pigment and a silica shell enveloping the core, wherein the pigment is an inorganic salt selected from the group consisting of potassium permanganate, potassium dichromate, nickel sulfate, cobalt-chloride, iron (III) chloride, and copper nitrate;

mixing the plurality of silica-coated nanoparticles with the plurality of cells to form a mixture;

placing the mixture under conditions that allow the nanoparticles to bind to cells expressing the preselected molecule; and

analyzing the cells for bound nanoparticles to identify the cells expressing the preselected molecule.

2. (Amended) The method of claim 1, wherein the silica-coated nanoparticles are fluorescent.

Cancel claim 3.

4. The method of claim 1, wherein the nanoparticles have a mean size between 1 nm and 300 nm.

5. The method of claim 1, wherein the nanoparticles have a mean size between 2 nm and 10 nm.

Cancel claims 6-11.

12. The method of claim 1, wherein the functional group is a protein.

13. (Amended) The method of claim 12, wherein the [functional group] protein is an antibody that specifically binds to the preselected molecule.

Cancel claim 14.

15. The method of claim 1, wherein the functional group is a nucleic acid.

16. The method of claim 1, wherein the functional group is a substance selected from the group consisting of biotin and streptavidin.

17. (Amended) The method of claim 1, wherein the silica shell comprises a reactive silicate selected from the group consisting of TEOS (tetraethylorthosilicate) and APTS (aminopropyltrimethoxysilane).

Add the following new claims:

18. (New) A method of identifying cells expressing a preselected molecule comprising the steps of:

providing a plurality of cells at least some of which express the preselected molecule;

providing a plurality of silica-coated nanoparticles coated with a functional group that binds to the preselected molecule, each of said nanoparticles having a mean size of less than 1 micron and comprising a core comprising a dye and a silica shell enveloping the core;

mixing the plurality of silica-coated nanoparticles with the plurality of cells to form a mixture;

placing the mixture under conditions that allow the nanoparticles to bind to cells expressing the preselected molecule; and

analyzing the cells for bound nanoparticles to identify the cells expressing the preselected molecule.

19. The method of claim 18, wherein the silica-coated nanoparticles are fluorescent.
20. The method of claim 18, wherein the nanoparticles have a mean size between 1 nm and 300 nm.
21. The method of claim 18, wherein the nanoparticles have a mean size between 2 nm and 10 nm.
22. The method of claim 18, wherein the dye is selected from the group consisting of Ruthenium-tris(2,2'-bipyridyl)dichloride and Europium-bis(2,2'-bipyridyl)trichloride.
23. The method of claim 18, wherein the functional group is a protein.
24. The method of claim 23, wherein the protein is an antibody that specifically binds to the preselected molecule.
25. The method of claim 18, wherein the functional group is a nucleic acid.
26. The method of claim 18, wherein the functional group is a substance selected from the group consisting of biotin and streptavidin.
27. The method of claim 18, wherein the silica shell comprises a reactive silicate selected from the group consisting of TEOS (tetraethylorthosilicate) and APTS (aminopropyltrimethoxysilane).
28. A method of identifying cells expressing a preselected molecule comprising the steps of:
  - providing a plurality of cells at least some of which express the preselected molecule;
  - providing a plurality of silica-coated nanoparticles coated with a functional group that binds to the preselected molecule, each of said nanoparticles having a mean size of

between 2 nm and 10 nm and comprising a core comprising a metal and a silica shell enveloping the core;

mixing the plurality of silica-coated nanoparticles with the plurality of cells to form a mixture;

placing the mixture under conditions that allow the nanoparticles to bind to cells expressing the preselected molecule; and

analyzing the cells for bound nanoparticles to identify the cells expressing the preselected molecule.

29. The method of claim 28, wherein the core is magnetic.

30. The method of claim 29, wherein the core comprises a metal selected from the group consisting of magnetite, maghemite, and greigite.

31. The method of claim 28, wherein the functional group is a protein.

32. The method of claim 31, wherein the protein is an antibody that specifically binds to the preselected molecule.

33. The method of claim 28, wherein the functional group is a nucleic acid.

34. The method of claim 28, wherein the functional group is a substance selected from the group consisting of biotin and streptavidin.

35. The method of claim 28, wherein the silica shell comprises a reactive silicate selected from the group consisting of TEOS (tetraethylorthosilicate) and APTS (aminopropyltrimethoxysilane).

36. A method of identifying cells expressing a preselected molecule comprising the steps of:

providing a plurality of cells at least some of which express the preselected molecule;

providing a plurality of silica-coated nanoparticles coated with a functional group that binds to the preselected molecule, each of said nanoparticles having a mean size of less than 1 micron and comprising a core comprising Ag and a silica shell enveloping the core;

mixing the plurality of silica-coated nanoparticles with the plurality of cells to form a mixture;

placing the mixture under conditions that allow the nanoparticles to bind to cells expressing the preselected molecule; and

analyzing the cells for bound nanoparticles to identify the cells expressing the preselected molecule.

37. The method of claim 36, wherein the nanoparticles have a mean size between 1 nm and 300 nm.

38. The method of claim 36, wherein the nanoparticles have a mean size between 2 nm and 20 nm.

39. The method of claim 36, wherein the functional group is a protein.

40. The method of claim 39, wherein the protein is an antibody that specifically binds to the preselected molecule.

41. The method of claim 36, wherein the functional group is a nucleic acid.

42. The method of claim 36, wherein the functional group is a substance selected from the group consisting of biotin and streptavidin.

43. The method of claim 36, wherein the silica shell comprises a reactive silicate selected from the group consisting of TEOS (tetraethylorthosilicate) and APTS (aminopropyltrimethoxysilane).